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Safety

**DOVER AFB BIRD AIRCRAFT STRIKE
HAZARD (BASH) PROGRAM**

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This instruction provides a base program to minimize aircraft exposure to potentially hazardous wildlife strikes. It implements AFI 91-202, *US Air Force Mishap Prevention Program*. This instruction applies to all host, associate, and TDY organizations on Dover AFB, including US Air Force Reserve members and units. 436 AW/SEF is the OPR for this instruction and will complete an annual review by 1 September. The 436 AW/CC is responsible for implementation of this instruction.

SUMMARY OF REVISIONS

This document is substantially revised and must be completely reviewed.

This publication incorporates procedures formally published in 436AW OPLAN 91-1, *Bird Aircraft Strike Hazard (BASH)*.

1. BASH Program Information.

1.1. Situation. Dover AFB is in an area of high Bird Aircraft Strike Hazard (BASH) potential. Located on the Atlantic migratory flyway, Dover AFB is a stop-over zone for thousands of migrating birds from September to April each year. The airbase is located in close proximity to three wildlife refuges, surrounded by grain and bean farms and has several large bodies of water nearby. A healthy resident goose population exacerbates the situation.

1.2. Specific hazards.

1.2.1. Waterfowl. Canada and Snow goose populations present a significant hazard to the Dover flying environment. In addition to a resident Canada goose population, migratory birds begin arriving in early October and depart in early April. These birds gather in flocks of several hundred or more and fly across Dover's approach and departure corridors during their daily transition

between nesting and feeding areas. Effective dispersal techniques include but are not limited to the use of a wildlife management expert who uses working dogs and pyrotechnics.

1.2.2. Birds of prey. Hawks, owls, and vultures soar over and near Dover's runways in search of food. While searching they often fly co-altitude with aircraft on the approach or departure flight paths. Mitigation efforts include ridding the airfield environment of rodents and the use of pyrotechnic dispersal techniques.

1.2.3. Gulls. Gulls present a particularly hazardous situation to Dover AFB. A distinct pattern has emerged where gulls fly from the coastal area across both runways enroute to the TILCON ponds in the morning. In the late afternoon they spiral up to approximately 500 ft. AGL and fly back to the coastal environment. During cold weather months the birds use the runway overruns as an area to warm themselves. Dispersal techniques include but are not limited to the use of working dogs, pyrotechnics, and paint ball guns.

1.2.4. Blackbirds. These species present a hazard during their flocking season. The flocking population peaks from mid-October through November and again in February. The large number of birds presents a significant threat when they feed on insects in the vicinity of the airfield. Dispersal techniques include the use of a long grass management, pyrotechnics, and pesticides.

1.2.5. TILCON ponds. TILCON is a gravel pit that has several large bodies of water on its property, located at the approach end of runway 01. The water attracts large numbers of waterfowl and gulls resulting in a significant hazard to air traffic. Gulls spiral up to depart the area in the afternoon and fly directly in the arrival and departure corridors. Methods used to mitigate this hazard include active harassment of birds and a cooperative environmental management effort with TILCON.

1.2.6. Waste Transfer Station. A waste transfer station operated by Eastern Shores Environmental Inc. (ESE) is located less than 1,500 feet from the departure end of runway 01. Methods used to mitigate this hazard include observing operations and monitoring bird activity.

1.3. Bird Hazard Working Group (BHWG). The BHWG meets to review wildlife strike data, identify and recommend actions to reduce hazards, and recommend changes in operational procedures. The BHWG meetings should discuss, but are not limited to the following topics: wildlife strike statistics, bird activity, habitat management/modification, BASH plan procedures, BASH awareness and education, and activities/results of the wildlife management contractor. The BHWG will meet quarterly during BASH phase I and monthly during phase II. The BHWG is hosted by Wing Safety (436 AW/SE) and chaired by the Vice Wing Commander (436 AW/CV). Other members of the BHWG include: 436 AW/CP, 436 AW/PA, 436 AW/JA, 512 AW/SE, 436 OG/CC, 3 AS/CC, 9 AS/CC, 436 OSS/CC, 436 OSS/OSA, 436 OSS/OSAA, 436 OSS/OSAT, 436 OG/DOV, 512 OG/DOV, 436 MSG/CC, 436 MSG/CEOD, 436 MSG/CEOPE, 436 MSG/SVBA, 436 MSG/CB, and the Wildlife Management contractor.

1.4. Habitat modification. By incorporating specific practices into the base land management plan, Dover AFB can maintain a flightline habitat less attractive to birds and other wildlife. Any base beautification or wetland enhancement plans will be coordinated through Wing Safety (436 AW/SE), Base Legal (436 AW/JA), Civil Engineering (436 CES/CEV), and Airfield Operations (436 OSS/OSA) IAW AFI 13-213, *Airfield Management*.

1.4.1. Managing grass height. AFI 91-202 paragraph 7.11.2.3 calls for the CES to: "mow airfield to maintain a uniform grass height between 7 and 14 inches." Following AFI 91-202 protocol of 7-14 inches will result in a mean (average) height of 10 inches across the airfield. It should be

mentioned that the goal of 7-14 inches is the “effective height.” This refers to the grass depth after it is cut, not the actual height of the mower blade. When cut to the minimum 7-inch level, slower growing species of grass are not allowed to grow properly, while other species are allowed to grow to extreme lengths before being cropped back. The result is a patchwork of short, stumpy grass species, interspersed with longer, fast-growing patches. There is a two-part solution to this problem. First, faster growing species of weeds should be eliminated or reduced by the controlled use of herbicides. Second, mower blade height should be adjusted to allow the mean grass height of 10 inches. A properly designed and maintained long grass management program strives to reduce the bird population on the airfield. Long grass works to deter birds by either preventing them from efficiently seeing the invertebrates close to the ground or preventing them from seeing into the distance, effectively making them unable to remain vigilant for the approach of predators. Short grass cutting (i.e. the manicured lawn protocol) should be limited as much as possible. The areas immediately around buildings and hangars on the base proper could be cut short if required, but the standard throughout the airfield environment should be longer grasses with only qualified exceptions.

1.4.2. Controlling broad-leafed weeds. Broad-leafed weeds attract a variety of birds, may produce seeds or berries, and may limit grass growth. Keep broad-leafed weeds to a minimum on the airfield. Apply herbicides as necessary to achieve this and comply with AFI 32-1053, *Pest Management Program*.

1.4.3. Planting sparsely vegetated areas. Eliminate bare areas on the airfield. Plant grass species unattractive to wildlife as necessary to maintain ground cover.

1.4.4. Fertilizing. Selectively stimulate grass growth to promote adequate vegetation height and uniform cover. Otherwise limit use of fertilizer that promotes lush green growth attractive to wildlife.

1.4.5. Removing edge effect. Maintain the airfield as uniformly as possible to reduce the transition zone between two distinct habitat types (e.g., brush to grassland).

1.4.6. Leveling of airfield. Level or fill high or low spots to reduce attractiveness to wildlife and prevent standing water. Ensure paragraph 1.4. is complied with.

1.4.7. Removing dead vegetation. Remove dead vegetation such as brush piles, grass clippings, etc. This will effectively remove the cover it affords.

1.4.8. Remove bird and animal carcasses from the airfield. In an effort to avoid attracting scavengers remove carcasses as soon as discovered. Forward remains that may have been caused by collision with aircraft to Flight Safety (436 AW/SEF) for identification.

1.4.9. Pest controls. Invertebrates and rodents are key food sources for many birds. Periodically survey and reduce these pests when required. Pesticides and traps can reduce pest populations. Only Environmental Protection Agency (EPA) approved pesticides are authorized; use these products in strict accordance with their instructions IAW AFI 32-1053.

1.4.10. Maintaining drainage ditches. Regularly inspect ditches to keep them clear. Maintain ditch sides as steep as possible (minimum slope ratio of 5 to 1) and mow vegetation to discourage wading birds and emergent vegetation. Improve drainage as necessary to inhibit temporary ponds or puddles.

1.4.11. Eliminate roosting sites. Control roosts by vegetation management of roost sites where possible. Prune trees to reduce the number of perches if necessary. Refer to the Land Management Plan and UFC 3-260-01, *Airfield and Heliport Planning and Design*.

1.4.12. Discourage wildlife feeding. Signs should be placed in picnic areas to educate the public on the hazard posed by feeding wildlife, particularly geese.

1.5. Bird Dispersal Operations. Airfield Management or the Wildlife Control Contractor may accomplish bird dispersal operations. Dispersal operations include, but are not limited to, the use of working dogs, radio-controlled airplanes, pyrotechnics, and paint ball guns. Prior to conducting dispersal the airfield control tower will be contacted by telephone or radio for coordination of movement. No movement of birds will be accomplished until cleared by tower personnel. Personnel performing dispersal will inform tower of the location of birds and anticipated direction of movement. If dispersal is being conducted off base use the grid map (see [Attachment 2](#)) to ensure clear communication of location. Upon notification and approval for movement of birds, tower will upgrade the bird watch condition (BWC) for affected runway(s) as appropriate. Once dispersal operations are complete and the birds have vacated the area, contact tower with this information. Tower will then change the bird watch condition as appropriate.

1.6. Depredation. Depredation may need to be accomplished to re-enforce reaction to pyrotechnics or eliminate a strike hazard from the airfield. Strict adherence to the U.S. Fish and Wildlife Service permit is required. The Deputy Base Civil Engineer maintains the permit; the permit must be renewed annually. The permit must be carried at all times while depredating. The number of each wildlife species taken must be documented. Refer to the permit for number of each species allowed, disposition of remains, ammunition requirements, and specific restrictions. The following paragraphs outline further restrictions that will apply to depredation on Dover AFB.

1.6.1. All personnel selected to take part in depredation will be certified by Security Forces Squadron (SFS) through the shotgun qualification course I.A.W. AFM 31-229, *USAF Weapons Handling Manual*, and AFI 31-207, *Arming and Use of Force by Air Force Personnel*. Authorized personnel can be any employee of Dover Air Force Base, including contract personnel.

1.6.2. SFS will issue a letter authorizing transportation of weapons and ammunition.

1.6.3. Transport weapons and ammunition IAW Delaware state law.

1.6.4. Notify SFS anytime firearms will be discharged on base.

1.6.5. Notify Base Legal when conducting planned depredation. If emergency depredation is conducted, notify as soon as possible.

1.6.6. Wing Safety is the OPR for all planned depredation.

1.6.7. All depredation conducted at TILCON will be coordinated with TILCON management.

1.6.8. Any depredation conducted on private property requires written consent of the property owner and prior coordination with base legal (436 AW/JA).

1.6.9. All participants will wear blaze orange during depredation operations.

1.6.10. An Air Force observer who is not shooting will act as depredation supervisor and will have authority to stop shooting or depredation operation at any time. Depredation will be stopped anytime an unsafe act or condition exists.

- 1.6.11. The depredation supervisor will brief all participants on purpose of depredation, fields of fire, bird height restrictions, no fire zones, and start/stop firing signals.
- 1.6.12. Clear “hold fire” communication will be established and briefed prior to depredation.
- 1.6.13. Instructions for dispersal operations (Paragraph 1.5.) will also apply for bird depredation.

2. Organizational Tasking.

- 2.1. Vice-Wing Commander. Chairs the BHWG and is the approval authority for recommendations.
- 2.2. Operations Group Commander (436 OG/CC).
 - 2.2.1. Retains BASH restriction waiver authority for all AMC aircraft departures and arrivals, and has approval authority for AMC aircraft departures and arrivals during BWC SEVERE.
 - 2.2.2. Issues specific guidance to the Airfield Operations Flight on procedures during Bird Watch Conditions.
 - 2.2.3. Makes operational changes to avoid areas and times of known hazardous bird concentrations, mission permitting.
- 2.3. Wing Safety (436 AW/SE).
 - 2.3.1. OPR for the BASH program.
 - 2.3.2. Completes annual review of this instruction by 1 September and forwards document to AMC Safety (AMC/SE) NLT 22 September.
 - 2.3.3. OPR for the BHWG.
 - 2.3.4. Responsible for wildlife strike reporting IAW section 3.
 - 2.3.5. Recommends and notifies appropriate base agencies of implementation/termination of BASH phase II.
 - 2.3.6. Serves as the Quality Assurance Evaluator for the wildlife control contract.
 - 2.3.7. Maintains liaison with Delaware Department of Natural Resources and local wildlife refuges.
 - 2.3.8. Educates base population on wildlife strike potential and procedures at Dover AFB.
- 2.4. Wildlife Control Contractor.
 - 2.4.1. Patrols Dover AFB and selected surrounding properties.
 - 2.4.2. Notifies tower of presence of hazardous bird activity on or around airfield.
 - 2.4.3. Conducts dispersal operations IAW paragraph 1.5.
 - 2.4.4. Conducts depredation IAW paragraph 1.6.
 - 2.4.5. Coordinates with Entomology for rodent and insect control.
 - 2.4.6. Coordinates with Entomology for emergency depredation issues.
- 2.5. Command Post (436 AW/CP).

2.5.1. Briefs all transient crews on Dover AFB bird avoidance procedures and BWC. Disapproves any request from transient crews to train in the local Dover area if Phase II restrictions are in effect (see section 4).

2.5.2. Coordinates for delay, diversion, and release of AMC controlled aircraft based on BWC. Issues bird watch advisories to all non-AMC aircraft arriving and departing Dover AFB.

2.5.3. Assigns X140 delay code for all AMC missions delayed due to wildlife hazard conditions.

2.5.4. Ensures transient aircraft involved in a wildlife strike fill out an AF Form 853, **Air Force Bird Strike Report**, and forwards it to Wing Safety.

2.6. Air Traffic Control (436 OSS/OSA).

2.6.1. Monitors level of bird activity using tower observation, RAPCON reports, aircrews reports, and wildlife control contractor reports.

2.6.2. RAPCON or tower supervisors can raise the BWC based on wildlife activity (see section 4). The tower supervisor, after coordination with the RAPCON supervisor, can downgrade the BWC if visual observation or radar reported bird activity reveals that the activity is not a probable hazard to flying safety. After a reported bird strike the BWC will be raised to MODERATE for reassessment of the BWC. During this time, tower, RAPCON, and aircraft in the pattern will look for and determine an appropriate BWC.

2.6.3. Advises airfield management of BWC.

2.6.4. During Phase II, tower will broadcast the BWC on the Airport Terminal Information System (ATIS). When the BWC is rapidly changing tower will include the following statement on the ATIS: "Due to rapidly changing bird watch conditions contact Dover Tower or Dover Approach for current bird watch condition."

2.6.5. Issue detailed advisories to all arriving aircraft through approach control and to all departing aircraft through ground control prior to switching to tower frequency.

2.6.6. During Phase II forward a copy of daily BWC log to Wing Safety.

2.6.7. Coordinates activities with bird dispersal units IAW paragraph 1.5.

2.7. Airfield Management (436 OSS/OSAA).

2.7.1. Coordinates on-base wildlife controls including harassment, grounds maintenance, and depredation.

2.7.2. Inspects airfield and runways for potential wildlife hazards.

2.7.3. Coordinates with the Bird Management Contractor for assistance in wildlife dispersal.

2.7.4. Notifies tower of hazardous wildlife activity on or around airfield.

2.7.5. Notifies Command Post of BWC.

2.7.6. Reports known wildlife strikes to Wing Safety.

2.7.7. Retrieves, or contacts Entomology to retrieve, carcasses on taxiways and runways.

2.7.8. Conducts dispersal operations IAW paragraph 1.5.

2.8. Civil Engineering (436 CES)

- 2.8.1. Monitors contractor compliance with the grass management program.
- 2.8.2. Conducts depredation IAW paragraph 1.6.
- 2.8.3. Conducts pest management including insect and rodent control.
- 2.8.4. Applies for and maintains federal fish and wildlife depredation permits.
- 2.8.5. Corrects environmental conditions that increase BASH potential.
- 2.8.6. Complies with habitat management as outlined in paragraph 1.4.
- 2.9. Current Operations (436 OSS/OSO)
 - 2.9.1. Schedules takeoffs/arrivals to comply with BASH phase II restrictions (see section 4).
 - 2.9.2. Coordinates with TACC to schedule mission departures to comply with BASH phase II restrictions to the maximum extent possible (see section 4).
- 2.10. Aircraft Maintenance Squadron (436 AMXS). Reports all wildlife strikes and forwards remains of strikes to Wing Safety.
- 2.11. Public Affairs (436 AW/PA)
 - 2.11.1. Maximizes public awareness and understanding of the impact wildlife has on safe flying operations.
 - 2.11.2. Informs internal and external audiences on the reason for, and ethical means of, controlling wildlife populations on Dover AFB.
 - 2.11.3. Approving official for information requests/news releases regarding the wildlife control program.
- 2.12. 436th Operations Group Tactics and Training (436 OSS/OSK). Assesses all low level training routes using Avian Hazard Avoidance System (AHAS) and Bird Avoidance Models (BAM) and ensures flying operations follow restrictions (altitude and airspeed) outlined by AHAS and BAM and phase II restrictions (see section 4).
- 2.13. Security Forces Squadron (436 SFS). Coordinates depredation IAW paragraph 1.6.

3. Reports and Forms.

- 3.1. All wildlife strikes (damaging and non-damaging) will be reported to Wing Safety on the AF Form 853, **Air Force Bird Strike Report**.
- 3.2. Wildlife strikes resulting in damage greater than \$20,000 will be reported IAW AFI 91-204, *Safety Investigations and Reports*.
- 3.3. Wildlife strikes will be entered into the Safety Automated System (SAS) as they occur, but no later than the 15th of the following month.
- 3.4. Wing Safety will forward wildlife remains to the Smithsonian Institution IAW AFI 91-204.

4. Flying Operations.

4.1. Bird Watch Conditions. The following terminology is established to rapidly communicate bird activity. Restrictions associated with each condition are applicable to all AMC aircraft. The BWC can be different for each runway and will be called as applicable.

NOTE: The restrictions associated with each condition do not preclude the aircraft commander's emergency authority to land if fuel status or other emergencies pose a greater risk.

4.1.1. BWC LOW. Bird activity (fewer than 5 large birds or 15 small birds) on and around the airfield representing a low potential for strikes. Local training and airlift missions approved.

4.1.2. BWC MODERATE. Bird activity near the active runway or other specific location representing increased potential for strikes. MODERATE will be declared when concentrations of approximately 5 to 15 large birds or 15 to 30 small birds are observed moving into locations (airdrome and within 20 degrees of arrival and departure corridors) that represent an increased potential for strike. During Instrument Meteorological Conditions (IMC), or between sunset and sunrise, the following will apply: if three or more targets within 5 NM of the threshold or within 3 NM of Departure End of Runway (DER) are depicted on the Airfield Surveillance Radar (ASR) within an area 20 degrees either side of the extended runway centerline, the BWC will be declared MODERATE unless visually determined not to be a probable hazard. During Visual Meteorological Conditions (VMC) from sunrise to sunset RAPCON shall provide "traffic calls" to tower personnel and aircrews on possible bird activity depicted on radar. The BWC will be upgraded only if visual sightings indicate reported bird activity presents an actual threat. Only initial takeoffs and full stop landings are allowed for the BWC MODERATE runway. The aircraft commander and ATC must coordinate an arrival or departure path that has the least amount of reported bird activity. If both runways are MODERATE, local transition training must either hold until the BWC is downgraded or coordinate with Command Post to go to an alternate training airfield.

4.1.3. BWC SEVERE. Bird activity on or immediately above the active runway or other specific location representing high potential for strikes. SEVERE will be declared when concentrations of approximately 15 or more large birds or 30 small birds are observed on or immediately above the active runway or arrival/departure corridors that represent a high potential for strike. During IMC, or between sunset and sunrise, the following will apply: if five or more targets are depicted on the ASR within an area 20 degrees either side of the extended runway centerline, out to and including 5 NM from the approach end of the active runway, the BWC will be declared SEVERE unless visually determined not to be a probable hazard. If three or more targets out to and including 3 NM from the DER are depicted, the BWC will be declared SEVERE unless visually determined not to be a probable hazard. During VMC from sunrise to sunset RAPCON shall provide "traffic calls" to tower personnel and aircrews on possible bird activity depicted on radar. The BWC will be upgraded only if visual sightings indicate reported bird activity presents an actual threat. Local training and airlift mission departures and arrivals require 436 OG/CC approval for a runway that is BWC SEVERE. The aircraft commander will coordinate with ATC to determine the best arrival/departure route and runway. The aircraft commander will coordinate through Command Post to obtain 436 OG/CC approval for air operations. Command Post will notify tower and RAPCON if operations are approved or disapproved.

4.2. Phase I Operations. Phase I operations concentrate on bird control actions and are in effect year round. During phase I, BWC will be used to communicate any strike hazards.

4.3. Phase II Operations. Phase II is implemented during the migratory and flocking bird seasons that historically take place from early October to early April. Additional restrictions to flying operations apply during phase II as follows:

4.3.1. Current Operations should not schedule arrivals/departures 30 minutes prior to and 1.5 hours after sunrise and sunset. Operations during this time require 436 OG/CC approval.

4.3.2. Use a minimum radar traffic pattern altitude of 3000 feet to the maximum extent possible. Deviations are permitted for higher priority tasking such as aircraft separation, etc. Bird radar returns, reported sightings, and bird watch condition should be used to decide whether to issue a lower pattern altitude.

4.3.3. SOLL II low-level missions will follow restrictions applicable with phase II for the route. Airspeed is limited to 250 KCAS or lower and minimum altitudes of 1,000 feet AGL for day and 3,000 feet AGL for night until slow down on all low-level training missions.

SCOTT E. WUESTHOFF, Colonel, USAF
Commander

Attachment 1**GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

AFI 13-213, *Airfield Management*

AFI 31-207, *Arming and Use of Force by Air Force Personnel*

AFI 32-1053, *Pest Management Program*

AFI 91-202, *The US Air Force Mishap Prevention Program*

AFI 91-202 AMC SUP 1, *The US Air Force Mishap Prevention Program*

AFI 91-204, *Safety Investigations and Reports*

AFI 91-212, *Bird Aircraft Strike Hazard (BASH) Management Techniques*

AFM 31-229, *USAF Weapons Handling Manual*

UFC 3-260-01, *Airfield and Heliport Planning and Design*

Abbreviations and Acronyms

AFI—Air Force Instruction

AFM—Air Force Manual

AGL—Above Ground Level

AMC—Air Mobility Command

AHAS—Avian Hazard Advisory System

ASR—Airfield Surveillance Radar

ATC—Air Traffic Control

ATIS—Airport Terminal Information System

BAM—Bird Avoidance Model

BASH—Bird Aircraft Strike Hazard

BHWG—Bird Hazard Working Group

BWC—Bird Watch Condition

CES—Civil Engineering Squadron

DER—Departure End of Runway

EPA—Environmental Protection Agency

ESE—Eastern Shores Environmental

FAA—Federal Aviation Administration

IAW—In Accordance With

IMC—Instrument Meteorological Conditions

OPR—Office of Primary Responsibility

RAPCON—Radar Approach Control

SAS—Safety Automated System

SFS—Security Forces Squadron

SOLL—Special Operations Low Level

TACC—Tanker Airlift Control Center

VMC—Visual Meteorological Conditions

Attachment 2

WILDLIFE REPORTING GRID MAP

